Guardian Angels † Central Catholic High School

*The mission of Guardian Angles † Central Catholic is to prepare all students to reach their fullest potential by learning and leading through Christ.*

Dual Credit Calculus Course Syllabus

**Northeast Community College Course Number:** MATH 2000

**COURSE TITLE:** Analytic Geometry and Calculus

**CATALOG DESCRIPTION:**

This course is a study of analytical geometry and single variable calculus. Topics include limits, continuity, derivatives, applications of derivatives, integrals, and applications of integrals.

**CREDIT HOURS:** 5

**TERM:** Fall 2011 and Spring 2012

**GENERAL COURSE OBJECTIVES**

The student will be able to demonstrate an understanding of the following topics in mathematics:

1. Perform computation of limits and continuity using appropriate analytical, graphical, and numerical methods.
2. Calculate derivatives using the definition of derivative
3. Calculate derivatives using the rules of differentiation
4. Apply the concepts of differentiation to analyze increasing and decreasing functions and determine concavity.
5. Apply the concepts of differentiation to calculate rates of change and perform optimization.
6. Calculate integrals using the definition of integrals and approximation.
7. Calculate integrals using the rules of integration.
8. Apply the concepts of integration to calculate area under a curve and volumes of solids.

**INSTRUCTIONAL MATERIALS:**

Textbook: Calculus Concepts and Applications: Paul Forester

Calculus 5e: James Stewart

Materials Required: Graphing Calculator

Notebook

2 Pocket Folder

Spiral Bound Index Cards

**STUDENT LEARNING OUTCOMES**

**Chapter 1,2: Limits and Continuity**

Outcomes: The student will:

* Evaluate rates of change and limits
* Find tangents to curves

⬩ Calculate limits of a function using the limit laws

⬩ Use the precise definition of a limit

⬩ Evaluate one-sided limits and limits at infinity

* Evaluate infinite limits and vertical asymptotes

⬩ Determine continuity of functions

⬩ Evaluate tangents and derivatives

**Chapter 3,4: Derivatives**

Outcomes: The student will:

* + Find tangents and derivatives at a point
  + Express the derivative as a function
  + Utilize differentiation rules for polynomials, exponentials, products, and quotients
  + Express the derivative as a rate of change
  + Find the derivatives of trigonometric functions
  + Utilize the chain rule and parametric equations
  + Use implicit differentiation
  + Evaluate inverse trigonometric functions
  + Find the derivatives of inverse functions (including inverse trig functions), logarithms and hyperbolic functions
  + Solve related rates problems
  + Utilize linearization and differentials

**Chapter 7,8: Applications of Derivatives**

Outcomes: The student will:

⬩ Evaluate extreme values of functions

⬩ Utilize the mean value theorem

⬩ Use monotonic functions and the first derivative test

⬩ Utilize the second derivative test to determine concavity and sketch curves

* Solve applied optimization problems
* Examine indeterminate forms and evaluate using L’Hopital’s Rule
* Utilize Newton’s Method
* Evaluate antiderivatives

**Chapter 5: Integrals**

Outcomes: The student will:

⬩ Estimate with finite sums

⬩ Use sigma notation and limits of finite sums

⬩ Evaluate definite integrals

⬩ Utilize the fundamental theorem of calculus

⬩ Evaluate indefinite integrals

* Use the substitution rule
* Find the area under a curve and between curves

**Chapter 6: Applications of Definite Integrals**

Outcomes: The student will:

⬩ Determine volumes by slicing and rotation about an axis

⬩ Evaluate volumes by cylindrical shells

⬩ Find the lengths of plane curves

⬩ Find moments and centers of mass

⬩ Determine the areas of surfaces of revolution

* Evaluate work problems
* Solve fluid pressure and force problems

**COURSE REQUIREMENTS and EXPECTATIONS**

1. Class attendance is **IMPORTANT!** All students are expected to in in attendance every day. Attendance has a direct effect on a student’s grade. If a student is not in class he or she is responsible for getting any notes missed as well as completing the assignment.
2. The student is expected to be in their seat when the bell rings. A failure to do so will result in a tardy and a demerit.
3. The homework will be a combination of 3day homework and problems from the book. Book homework may be periodically collected.
4. Please keep your hand-in work neat and readable. A pencil with an eraser works great for making corrections instead of crossing out. Justify your answers by showing the process involved. Answers only will receive NO credit.
5. All work handed in (including tests, quizzes and daily) will be done in **pencil**.
6. Read the textbook material and study the examples in the text. Taking notes and copying examples from the lecture can be helpful even if you don’t understand them. It gives you a starting point for questions later.
7. Student will be given unit exams, quizzes and a final exam.
8. The final exam is mandatory. Sorry! Failure to take it will result in an automatic F for the course.
9. ASK QUESTIONS! I am available before and after school to answer questions. If you are struggling with a concept than so is somebody else! I encourage you to ask questions at the start of class to ensure that we are all on the same page.
10. Check Sycamore….often.

**METHODS OF EVALUATION**

Students will be evaluated on the basis of: homework (5-20 points), quizzes (50 points each), and exams (100 points each) using total points.

**Grading Scale:** 100 A+

90 – 99 A

88 – 89 B+

80 – 87 B

78 – 79 C+

70 – 77 C

68 – 69 D +

60 – 67 D

0 – 59 F

Instructor Information:

1. **Instructor**: Tarah Jansen
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3. **Email:** tjansen@esu2.org

I have read and I understand all information contained in this document:

student signature

parent signature